

ADVANCING THE NATIONAL PARK IDEA

NATIONAL PARKS SECOND CENTURY COMMISSION

Science and Natural Resource Committee Report

A Science-based System for Tomorrow



THE DIVERSITY OF THE NATION. IT IS CRITICAL TO ACTIVELY RECRUIT THE NEXT GENERATION OF NPS LEADERS SO THAT THE WORKFORCE REFLECTS THE DIVERSITY
tly endowed source of funding available in perpetuity to support the National Park
We recommend
must strengthen scientific and scholarly capacity to address climate change
in every dimension. That standing cannot be achieved by relying on the status quo. National
learning, civic engagement and give voice
vice replace broken, dilapidated, out-of-date, inaccurate, and irrelevant media, including exhibits, signs, films, and other technology-delivered information
capacity. We must think and act in new ways and build a robust
ON'S GREAT RIVERS AND LAKES, ITS BROAD BAYS AND GULFS WITH THEIR EXPANSIVE WATERSHEDS, AND THE LIFE-SUSTAINING RICHNESS OF OUR
We advise Congress
ship enhance both the educational programs offered to the public and res
ority, adequate staff, and support at the highest levels to engage in regional ecosystem planning and landscape-level conservation and historic preservation
d affirm America's expanding national
O PROTECT, RESTORE, AND SUSTAIN THE MOST VALUABLE PLACES, LANDS, AND WATERS IN THE UNITED STATES. WE RECOMMEND A PRESIDENTIAL

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Vision

The National Park System preserves a science-determined representation of the nation's terrestrial and ocean heritage unimpaired. The National Park Service provides leadership in an American landscape that is managed to sustain ecological integrity, beauty, enjoyment, and national identity. National parks are key elements of a network of sustainable uninterrupted ecological systems of linked lands and waters that work for both people and nature, and have an active role in preserving them. National parks become epicenters for catalyzing dialog on the future American landscape. National parks teach the nation place-based science and an environmental ethic that reaches around the world. • To succeed in managing the National Park System, the National Park Service becomes the scientific authority on its resources, on ecosystem dynamics, and the restoration of impaired lands and key species.

Introduction

Science tells us that the next hundred years may be vastly different in the scale and speed of human enterprise and its effect on nature (McNeill 2000). Many scientists believe that human activities are changing the planet at a dangerous pace—an “uncontrolled experiment” with great implications for our nation, and for its national parks.

National identity and quality of life are shaped by a nation's natural heritage. Historically, natural resources determined where societies arose. Now, to a large extent, humans are dictating where nature can persist. National parks are a human invention wherein it is intended that nature and human use both thrive in perpetuity. As the nation that “invented” national parks, we must now ensure they thrive in a challenging future. In turn, national parks are likely to repay that investment many fold.

There's a long litany of serious indicators that the future world will be very different. Humans have already consumed nearly 50% of the Earth's productivity for their own use while accounting for over 25% of the CO₂ level in the atmosphere. Troubling indications of species declines in the U.S. include the 60 % of freshwater fish species that now appear on some state or national threatened or endangered list, and 80% of freshwater mussel species. Perhaps most ominous is the precipitous decline in oceans fisheries; 90% of the large fish are gone, and fishing pressure continues unabated—serially depleting species after species. Worldwide, 50% of mangrove forests—fish nurseries—have been destroyed. National parks have their own instances of over-fishing (Appendix A;

G. Davis, National Park Service (Ret.)); as one example, state fisheries management in Biscayne National Park has been such that University of Miami researchers recently made 24 SCUBA dives before finding the first legal-sized grouper.

In our coastal waters and in the uplands aggressive invasive species represent an enormous threat to the native plants and animals of the nation and its national parks. Current conditions in national parks vary, reflecting their individual land use histories and that of their surroundings (Appendix B; G. Dethloff, NPCA).

The National Park System stands now as a national treasure, and one whose value will be far greater tomorrow.

While scientists have been measuring how fast the world is changing for some time, it is revealing that some changes, such as the rapid loss of the Arctic ice cap, can still surprise them. At the same time, many citizens and policy-makers remain confident that humans are not significantly impacting the vast biological, oceanic and atmospheric processes upon which our quality of life depends. This suggests a need for better communication about the future and a national resolve to prepare for it.

However the future unfolds, a great nation must prepare for all inevitabilities. It is clear to this Committee that a prudent priority, and potentially invaluable investment for our nation's future, is to capitalize on the national park idea, and the experience and success of our National Park Service.

The Science and Natural Resource Committee recommends:

- I. Building the National Park System to fully represent the nation's natural legacy;
- II. Ensuring its long-term health and viability in a changing landscape; and,
- III. Re-tooling the National Park Service to be successful in long-term stewardship of the natural heritage of so favored a nation.

Building a National Park System to fully represent the nation's natural legacy: "A good tinkerer saves all the pieces."

The next 100 years may see unprecedented challenge to the underpinnings of nature. If, as science tells us, our species' present rate of resource consumption and disruption is likely to cause significant changes in the ecological services that support our future quality of life, one of the most prudent steps a nation can take is to protect a representative sample of its natural heritage, and the ecological services provided, and maintain them unimpaired. Protecting those intact reserves—those blueprints and storehouses—will provide an important long-term asset.

Congress could not have been foreseen such change when it created the National Park System in 1916, nor could it have imagined the range of roles this system might play in meeting society's needs in its second century. The National Park System stands now as a national treasure, and one whose value will be far greater tomorrow.

In the next 100 years, parks may be called upon to serve new roles such as early warning sentinels, last havens for vanishing species, reservoirs of rare genetic materials, sources of genetic materials for species and systems restoration, catalysts for communication on environmental issues, and certainly links for urbanites and youth separated at birth from nature. The information contained in intact natural systems can be our

blueprints for restoration—if we need to find our way back. National parks preserve options for solving problems and seizing opportunities we have yet to discover.

Since the environmental stakes are so high, it makes sense to hedge all bets by investing in national parks. The National Park System must now be perfected—to be truly representative of our natural heritage as a nation. Aside from the spiritual, recreational, personal health, and economic returns, a viable and representative National Park System is a most valuable investment in a time of uncertainty and change.

National parks preserve options for solving problems and seizing opportunities we have yet to discover.

Perhaps also unforeseen, the National Park Service experience in maintaining resources unimpaired, while valuing human use, may prove useful in and of itself. The mindset created by managing use within the limits of natural system resilience leads to understanding how to live within environmental means. Such lessons may resonate if nations are forced to take on the difficult task of modifying what societies expect from a planet with seemingly limitless opportunity for material wealth and comfort.

To date, Congress has wisely built a pioneering and world class National Park System. That system now requires a strategic vision and growth process to fulfill its potential. The National Park System has currently grown to nearly 400 units, but without a scientific rationale or a process that follows a coherent strategy. A clear vision and strong criteria for inclusion in the system must now replace the ad hoc process that has characterized recent decades of system growth.

To capitalize on its "best idea" 100 years ago, it is time for America to perfect and protect it. The Science and Natural Resource Committee recommends a fully representative (some of all that's important) and viable National Park System (with resiliency (big enough or having connectivity) and redundancy (not all eggs in one basket)) as a fundamental investment for the future well-being of the nation.

COMMITTEE RECOMMENDATION 1**Provide a science-based foundation for building a National Park System for the 21st Century:**

- Congress requests a comprehensive study by the National Academies of Science (or alternatively, the president through a Presidential Commission) to design a national park system that can fill the roles American society may need from it in the next 100 years. This study must establish a scientifically-based rationale and strategy—and science-based eligibility criteria—for retaining a complete and viable reflection of the nation's heritage. This system can serve as a lasting foundation for a nation blessed with an extraordinary natural heritage and quality of life. The greatest emphasis in new units may be found necessary in the oceans across the Economic Enterprise Zone (EEZ). This study should review options for transferring lands among agencies (e.g., including National Monuments such as the Marianas Trench, Northern Hawaiian Islands, and possibly via the military base realignment and closure (BRAC) process) for the most logical level and most efficient approach for their protection.
- National Park Service scientific staff should review and prioritize (according to potential development impacts to park ecological integrity and visitor experience) all existing national park in-holdings for purchase on a willing seller basis, and promptly deliver this list to Congress for acquisition with Land and Water Conservation funding in a time frame that reflects the importance and urgency of this initiative.

Maintaining the health of our treasured landscapes—create a national conservation strategy

Lands that become isolated fragments of nature, including national parks, lose their species over time. Smaller parcels, and parks, will lose them faster. Genetic isolation, local extinctions, and local catastrophic events gradually take their toll, and the complex array of species—or “nature”—fades away. Protected areas can not usually be made large enough to overcome this fact. Yet with a conscious effort to maintain important wildlife pathways and connections between areas, nature replenishes itself and basic processes necessary to support life remain unimpeded. Hence protected areas—where nature rules—need only some strategic connections from sympathetic management on adjacent lands to retain functional connections

and long term viability. The goal of maintaining strategic connections must be shared across federal agencies and by willing private land owners.

...the inspirational nature of a park experience today cannot persist without better coordination of land uses to preserve wildlife movement and replenishment.

Early national parks were wild areas surrounded by open range and undeveloped land. More recent parks are small, suburban, or urban units (Appendix C, Svancara and Scott, USGS). Today all are surrounded to different degrees—often by stark and disruptive land uses. Many park plant and animal communities are now isolated from migrating individuals that replenish local wildlife populations and provide new genetic material. While what data exist indicate that today's national parks are in relatively good shape—in some cases because of hands-on re-introduction of key species—the inspirational nature of a park experience today cannot persist without better coordination of land uses to preserve wildlife movement and replenishment.

Step one in a coordinated national conservation strategy: Stop federal agency activities from working at cross purposes

Perhaps the best news comes from the fact that better orchestration of federal lands can be a logical and powerful first step in a national strategy for keeping the natural beauty and health of our land. Without major new expenditures, better federal coordination in some areas can combat the effects of habitat fragmentation on wildlife and to some degree accommodate the shift of plants and animals responding to climate change impacts.

Federal lands make up roughly 30% of the nation, with much of it in the west, and often with multi-use lands surrounding the nation's most treasured landscapes (national parks, wilderness areas, wildlife refuges, etc.) They are managed by a number of federal agencies, notably the Department of Agriculture (US Forest Service) and the Department of the Interior (Bureau of Land Management, US Fish and Wildlife Service, and National Park Service).

Presently each agency follows its own primary mission, sometimes in direct conflict with the land use of its neighboring agency. It is time for each agency, while continuing pursuit of its own mission, to consider national heritage interests, such as national parks, in their land management and leasing decisions. The Commission visited Yellowstone where clear-cutting in National Forests along the park boundary has in the past produced a dramatic truncation of wildlife habitat. A similar approach has isolated other parks (for example, Olympic NP) resulting in the well-known reports by astronauts who wondered aloud what the green squares were (national parks) that stood out as they looked back towards earth (Appendix D, E. Lewis). Similar impacts occur in a number of parks from mining, oil and gas leasing, grazing leases, etc.

Since it will be difficult to increase the size of most national parks, and since transfers of federal lands between agencies or changes in agency mindsets are difficult, the long term solution may be in broadening management responsibility of all public lands to include compatibility with the nation's long term protection of its natural heritage. To protect the nation from substantial losses in its biodiversity, activities in larger ecosystems must be harmonized in a manner that sustains communities, economies, and wild life, as well as parks. An advantageous place to begin is by orchestrating all federal lands—including the coastal zone and the EEZ (The Exclusive Economic Zone, provided by the 1982 UN Convention of the Sea, gives nations exclusive exploration rights and use of marine resources out to 200 nautical miles from their coasts.) toward a common goal of protecting the nation's heritage while multi-use agendas are pursued. Climate change will accentuate the need for a united response among federal agencies if the nation's natural heritage and biodiversity are to be maintained (Appendix E; L. Wellington, National Park Service).

The Committee believes that the nation's natural heritage must be seen as an invaluable, irreplaceable part of the nation's patrimony; and that the nation's natural heritage must be given a similar level of priority routinely accorded other areas of national security.

Natural assets of national value (e. g., National Parks, Wild and Scenic Rivers, National Trails, National Wildlife Refuges and National Landscape Conservation Lands (in the Department of the Interior (DOI)), Wilderness Areas (in DOI and the Dept. of Agriculture (DOA), National Forests (DOA), National Monuments in DOI and DOA, Marine Sanctuaries in NOAA (Dept. of Commerce) should all benefit from

harmonizing activities and regulatory decisions by other agencies that often pursue conflicting agendas without regard to the larger issue of protecting our national heritage.

Congress (through legislation) or the president (through an Executive or Presidential Order—for example see the May 2009 Executive Order for Chesapeake Bay Protection and Restoration) can direct all agencies to manage their lands in the best long-term interests of the nation's most treasured landscapes—parks, refuges, wilderness areas, and national landscape conservation lands, national historic landmarks and national natural landmarks, etc. Protection of the nation's heritage must be a shared goal of all federal agencies.

Agencies managing treasured lands should be given early consultation opportunity and expedited dispute resolution when necessary. This will not require new funding; it does require new leadership that fosters awareness of within all federal agencies of the common goal of protecting the nature of this nation—as reflected in the nation's treasured landscapes.

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COMMITTEE RECOMMENDATION 2

Create a new Executive Order for federal lands to make ecosystem management an overriding responsibility on all federal lands, inland waters, Great Lakes and oceans management.

- The new Executive Order (EO) would identify protection of the nation's natural assets as a common goal for all agencies. All federal agencies will provide support to this goal as a priority while pursuing their respective agency agendas.
- The EO would provide federal standards based on ecosystem management principles for the management of wildlife on all federal lands, with the highest standards of protection maintained on national park land and waters. Fish and wildlife management on all federal lands and

waters would be uniformly consistent with applicable ecosystem-based management policies and practices, and federal agencies will not allow less protective management by any other authority.

- The EO will ensure that any action taken on federal lands and waters adjacent to or affecting National Park Service resources will require early consultation and a project agreement with the National Park Service.
- The EO should encourage restoration of key species wherever feasible on national park lands in concert with other agencies, and that national wildlife treasures such as the original genetic strain of American bison be restored on federal lands within their native range wherever feasible.
- The EO should direct ocean, Great Lakes, and coastal parks units to be managed such that they provide replenishment of marine habitats and marine life in perpetuity, and, direct that national parks be used as laboratories to understand how to effectively zone marine protection areas for long term restoration and conservation of fish and other marine life, to adaptively manage to optimize protection zones, and to communicate the lessons learned.
- The EO should provide an assessment of opportunities for marine national parks within the EEZ. The EO should call for consolidation of jurisdictions, policies, practices, and management of submerged lands, open waters, and marine life for long-term sustainability.
- The EO should capitalize on national parks as showcases, as potential communication platforms to demonstrate climate change adaptation, mitigation, and communication programs, technology and practices.
- The EO should set a goal for all national park units to be: a) carbon-neutral in their park operations by 2016; b) carbon neutral in all park operations and visitor services (including concessions operations by 2020); c) model programs to disseminate effective messages, practices and mindsets as one avenue for educating the public on responding to human-induced climate change.
- The EO should provide policy directives, federal regulations, and an active role in promoting conservation partnerships and working relationships with the private land trust community and other non-governmental

organizations that foster ecosystem protection with the intended outcome to strengthen the long term protection for national parks and lands of national heritage value.

- The EO should require a review of laws and policies established long-ago to promote exploration and settlement of the west, such as those subsidizing mining and grazing, for their economic and ecological compatibility with the future needs of the National Park System and other natural heritage assets.
- The Executive branch and Congress should jointly consider new models of oversight and finance to isolate national parks from continuous pressure for short-term, unsustainable, and vested-interest agendas (Attachment F; testimony of Robert D. Rosenbaum, Washington, DC Public Listening Session, Second Century Commission, Feb. 20, 2009).

Step two in a national conservation strategy: Facilitate willing landowner protection of the ecological value of their land

Perhaps the more difficult part of a national strategy for a sustaining our nation's natural heritage is in enlisting private land owners to the cause of larger landscapes that work for all. This includes private, state and other non-government lands. Federal involvement in the use of private lands raises many issues and concerns, and it should be predicated on willing participation by landowners who care about the ecological future of both their nation and their land.

In 1966, Congress gave the National Park Service, via the National Historic Preservation Act (NHPA), a leadership role in encouraging private and local participation in the conservation of historical and cultural sites. That Act has had considerable success and impact in stimulating the preservation of historic resources on private lands through providing incentives and protection standards (J. Rogers, pers. comm.). Congress was careful to give the National Park Service a role that was non-threatening to private property rights.

In the same fashion, Congress must now provide National Park Service a similar role (and authorities) for preservation on the scale that maintains natural resource systems that can function unimpaired over time—sustaining our wildlife heritage indefinitely. Appendix G is a draft 'Natural Heritage and

Sustainable Future Act’ which paraphrases the NHPA of 1966 with the kinds of roles and incentives that can successfully encourage and reward willing private land owners for participating in a national landscape-level nature protection strategy.

COMMITTEE RECOMMENDATION 3

Create new legislation, modeled after the National Historic Preservation Act of 1966, to enhance protection of natural heritage values on non-federal lands.

- The new legislation would provide an approach similar to the NHPA, with National Park Service providing leadership, technical assistance, overall protection standards, grants, and incentives for achieving the levels of ecosystem unimpairment necessary for the nation’s sustained quality of life.
- The legislation would provide a new strategic approach to maintaining important wildlife corridors for long term sustainability of the full range of native plants and animals.
- The legislation would provide for the identification of heritage lands, corridors, and waters—those public and private lands important to maintaining the nation’s plant and animal diversity.
- The legislation would provide enhanced incentives (and their transaction costs, such as appraisals, surveys, etc.) for those private landowners within key migratory pathways, waterways, and viewsheds who voluntarily maintain lands to standards that support national conservation goals and maintain sense of place.
- New legislation with tax incentives, grant funds, and enhanced RTCA capability should authorize an increase of \$80 million in base funding.

Re-tooling the National Park Service to be equal to the task ahead

Managing 84+ million acres of complex natural systems unimpaired is a highly technical endeavor. Differentiating between natural variation, the impacts from a quarter billion visits per year, and extra-boundary influences on park health, requires high levels of certain skills found nowhere else. Each park is different and each element of a park is important.

While the implications of the Organic Act have driven National Park Service to be a pioneer in the science of wildland fire, natural sounds, night sky, air quality modeling, barrier island dynamics, all taxa biodiversity inventories (ATBIs) and “bioblitz’s”, inventory and monitoring, ecosystem and species restoration, etc., surprisingly the National Park Service has not traditionally supported a strong role for science in park management (Sellars 1997).

This paradox has led to important failures, resulting in a number of critiques, including several studies by the National Academy of Science’s National Research Council (NRC). For example the NRC’s Robbins report (1963) stated:

- “It is inconceivable to this Committee that property so unique and valuable as the national parks, used by such a large number of people, and regarded internationally as one of the finest examples of our national spirit, should not be provided with sufficient competent research scientists in natural history as elementary insurance for the preservation and best use of parks.” (p. 32)
- “The Committee was shocked to learn that for the year 1962 the research staff (including the Chief Naturalist and field men in natural history) was limited to 10 people and that the Service budget for natural history research was \$28,000—about the cost of one campground comfort station.” (p. 32)
- “Consultation with the research unit in natural history the National Park Service should precede all decisions on management operations involving preservation, restoration, development, protection and interpretation and the public use of a park.” (Recommendation #10, p. xiv).

Similarly, in 1992 the National Research Council’s *Committee on Improving the Science and Technology Programs of the National Park Service* stated:

- “With the 20/20 vision of hindsight, any examination of the national park system can uncover many cases in which a lack of understanding of park resources has led to problems—degradation of resource quality, increased conflicts between visitors and resources, or the escalation of minor issues into major problems.” (p. 2)
- “Since the first major independent reviews of the adequacy of the National Park Service science program were conducted in the early 1960s, many experts have shared their views on the scope and quality of the National Park Service

research program. In all, the many reviews provide both general and very specific recommendations for strengthening science in support of the parks. Many of the suggested improvements were recommended repeatedly, yet few have been effectively or consistently implemented.” (p. 56)

- “Indeed, many administrations have come and gone during the past 30 years and they have operated in very different settings, but with the same result—science has not taken hold as a key element in the foundation of the National Park Service mission.” (p. 57. National Academy of Sciences, 1992).

National Park Service Director James Ridenour responded favorably to the 1992 report and moved to implement the NRC recommendations, including the most internally contentious one (line authority for scientists to manage scientists—eliminating potential for, or any appearance of, influence from park managers on scientific results.) However Ridenour soon left with the change in administrations in 1993. The Clinton administration (and DOI Secretary Babbitt) chose to take all biological research scientists from all DOI bureaus to form a new bureau, the National Biological Survey (NBS) in 1994. The NBS did not succeed as a separate bureau and became the Biological Research Discipline of the U. S. Geological Survey (USGS).

Management decisions strengthened by ever increasing scientific certainty generate credibility and support from local communities, stakeholders, and the public at large.

Today’s National Park Service has come a long way in overcoming the traditional reticence towards a strong role for science in managing national parks. In spite of the absence of a biological research function, the NRC’s 1992 recommendations have been closely pursued in the National Park Service’s “Natural Resource Challenge”—an effort that began in 1998 to bring better resource information to park managers. That initiative has built bridges to academe, to USGS and other agencies, and provided an inventory and monitoring effort in direct support of park management. However, the crucial missing science element necessary for keeping national parks unimpaired over generations is its own self directed research capacity. This in-house capacity must be targeted towards site-specific, long-term research with continual synthesis and direct application of science to management decisions and outreach.

To meet future challenges head-on, the National Park Service must be re-constituted with science and information-based management as its foundation. In-park researchers must be present to provide long-term information on complex, dynamic natural systems, continuously assimilating their understanding into usable knowledge. Over time, each national park can become authoritative through long-term research projects carried out by sufficient internal staff to generate, accumulate, integrate and transmit knowledge and experience beyond the length of individual careers. Management decisions strengthened by ever increasing scientific certainty generate credibility and support from local communities, stakeholders, and the public at large.

Knowledge and outreach offer the national parks’ best protection.

National Park Service leadership must be outfitted for outreach to park neighbors and visitors on difficult complicated issues. Systems thinking and development of integrating tools such as multi-stakeholder dynamic models will allow National Park Service to engage stakeholders in communally assessing future outcomes of land use decisions. The agency’s culture, organizational structure, personnel assignments, career ladders, and budgets must be broadened to accommodate the complexity of the task and the long view that is required for unbroken resource protection over generations. Knowledge and outreach offer the national parks’ best protection.

COMMITTEE RECOMMENDATION 4

Build a balanced program of research for national parks that can only come from an internally directed research program. The program must center upon in-park, or monitoring program-based, research scientists. The National Park Service science effort should continue to draw heavily on partnerships with academe, and especially USGS, but Congress and National Park Service must also provide adequate funds and National Park Service research positions. The supervision and personnel management framework must ensure long-term site fidelity, scientific objectivity, career ladder opportunities, and direct incorporation of findings into park management.

- Configure the new research element as recommended by the National Research Council in 1992.
- Provide annual increases of \$10 million in research base funding for 10 years so that a stable \$100-million research program is in place by 2021.
- Develop ties to the National Science Foundation and Office of Naval Research and other organizations. Encourage partners to view national parks as key research venues where their basic science is welcomed, supported, and directly applied for societal good—providing a double return for each research dollar invested.
- Provide scientists, citizen scientists, educators, and volunteers opportunities to use parks for science as well as participate for providing science for parks.
- Place the director, or his/her deputy, on the president's science advisory committees (such as the National Science and Technology Council and Office of Science and Technology Policy).
- Make both ecosystem and species restoration a hallmark of National Park Service applied science capability; develop demonstration efforts to restore the American chestnut and the American bison to exemplify the nation's resolve to maintain its natural heritage unimpaired.
- Assemble an internet encyclopedia of the biodiversity of national parks and their natural history as an interpretation and science teaching archive.
- Provide National Park Service training in modeling development and multi-stakeholder dialogue processes (\$3 million annually).

Our Committee is honored to submit these thoughts and recommendations and believes their implementation to be of the highest importance and value to the future well-being of the nation and to every citizen, to whom the National Park System belongs.

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Appendices

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